JOURNAL OF INTERNATIONAL AND AREA STUDIES 39
Volume 20, Number 1, 2013, pp.39-59

India's Competitiveness Position with China in Global Market

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India and China have experienced almost similar kind of political history till the middle of the last Century, although experienced very different developmental path thereafter. In this paper an attempt has been made to investigate the reason for this with respect to the competitive position of both the countries in the World. The sources of the competitive edge for both the countries have been identified. The estimations have been made at disaggregated commodity level where commodity groups have been made with respect to specific sectors as well as the developmental characteristics of the commodity bundle. So, it becomes easy to identify the sectors of strengths/weakness as well as at which stage of development the two countries are competitive at present.

Keywords: Dynamic Revealed Comparative Advantage, Shift Share, Constant Market Share, Competitiveness Effect, Commodity Composition Effect, Market Distribution Effect

1. INTRODUCTION

High growth rates in China and India during the past few decades have led to a flood of literature on the two economies. Two major conclusions have emerged from this literature. First, while China has achieved this growth mainly by riding on external demand, India has achieved its own growth mostly by the strength of its domestic demand (Tendulkar, 2000). Second, while the growth of manufacturing sector exports has been the key factor in China's growth, the main external driver for India has been the services sector. In spite of their similarity in economic size, factor abundance, and their proximity to each other it appears therefore that the countries have taken quite diverse routes in their pursuit of economic growth.

This, however, does not mean that India is closed to the idea of fuelling economic growth thorough the export of manufactured goods. In fact, enhancing the manufacturing export performance is one of the core strategies of India's liberalization program since the 1990s. Before that, India had traditionally followed a strategy of import substitution. Though this did not necessarily mean that there was a strategic aversion to exports,[1] active efforts towards export promotion did not start until the liberalization regime of the 1990s materialized. An important question that has sometimes been raised but rarely analyzed in sufficient details in the context of India's development strategy since the 1990s is: was 1991 already late to venture into a regime of globalization and a regime shift toward a more export oriented growth policy? In the context of this paper this is an important question to ask, as it is often alleged that the belatedness is one of the core reasons for India's lackluster performance on the economic front compared to China in the 1990s (Tendulkar, 2000).

[1] "Export promotion measures have been undertaken only on a piecemeal basis since the payments crisis of 1956-58 ....." in Krueger (1961:436-442).

China embarked upon its policy of liberalization and export orientation from the early 1980s (reform programme actually launched in 1978) and India launched her economic reforms programme in 1991. The resultant lag of little more than a decade has led to fundamental differences in the structures of the two economies. By the time India took the plunge towards outward orientation, China's manufacturing sector was already far advanced in resource usage and oriented towards producing goods for the global market. This meant that India had either to take an alternative route towards growth (which it took by emphasizing on the service rather than the manufacturing sector) or it had to rapidly shore up production capabilities to be able to compete with China in the global market. That India is yet to be able to do so is obvious when we look at the manufacturing export figures of the two countries (see the next section). But are there areas in the goods sector where India still hangs on and still possess enough advantage to be able to out-compete China? This paper addresses this and other related questions in the context of export performance of the two countries.

The route that we take is the following: we first identify products of strength and weakness for the two countries and, secondly, probe into the sources of the strengths and weaknesses. To identify the products we use a methodology that is often employed for separating goods for differential treatment during the formulation of bilateral or multilateral trade policies. Though it is generally understood that such a method of identification exist, there are hardy any academic papers that clearly spell out what the methods are and to what extent they are effective. The methodologies also possibly vary from researcher to researcher, and since different sets of researchers in a variety of organizations get involved in suggesting products lists for various bilateral agreements, there is a need for standardizing the diverse methodologies that are been used. This would make the identification process consistent for all bilateral agreements that a country signs.

One of the objectives of this paper is to clearly specify the methodology for the most rudimentary of classifications: separating products into those in which a country has strength in the sense that it is likely to compete well in the global market for these products and those in which it has weakness in the sense that other countries would be able to easily out compete the domestic producers of these products. The methodology is appropriate for us in this paper as this is precisely the exercise that we wish to do with respect to India and China – identifying product categories where India will or will not be able to compete with China in the global market.

Once this exercise is done, we use the Constant Market Share analysis developed[2] by Leamer and Stern (1970) to decompose the growth in total exports of each of the two countries into basically three components: world trade effect (portion of growth in exports attributable to growth in external demand), commodity composition effect (portion of the export growth attributable to dependence on higher-than-average growth commodities), market distribution effect (portion of the export growth attributable to dependence on markets with higher-than-world growth in imports), and a competitiveness effect (attributable to the country's ability to effectively compete with other suppliers). One of the weaknesses of the method is its sensitiveness to commodity and country-group aggregation/dis-aggregation. As far as commodities are concerned, the problem arises mainly because commodities are always aggregated into broad groups before conducting the

[2] The technique was first applied to data on international trade by Tyszynski (1951), but Leamer and Stern (1970) formalized the model with appropriate interpretations of various components.

analysis. We, however, manage to overcome the problem by operating at the 6 digit Harmonised System (HS) classification level – the highest level of classification in which trade data is reported by countries to the United Nations – and then aggregating across countries. The resultant analysis gives us a glimpse into the sectoral comparison of export performance in India and China and pinpoints reasons where India lags. The paper contributes to the large and growing volume of work on the performance of the two countries both as individual units[3] and on a comparative basis.[4]

As we have already mentioned there are a host of papers on India and China's economic performance both individually and on a comparative basis. We will have occasion to refer to some of them in the next section. However special mention should be made of two works that address issues very similar to ours. Some scholars compare the trade expansion of India and China in the international scenario. Their main conclusion is that China poses challenge for the East Asian economies, the US and most of the European countries while India appears to be a competitor mainly for its neighbouring South Asian countries. The approach that they follow to arrive at this conclusion is to compare the values of three well known indices that portray the extent of complementarity/competitiveness between pairs of countries. Since we are not interested in the entities of the competitors whom we lump together as the "rest of the world" (our main interest being in product level competition) the main thrust of the paper is fundamentally different from ours. A more comprehensive analysis of competition between China and India in third country markets is reported in Bhat, Guha and Paul (2008). In particular they report a table from UNCTAD (2002) that compare country pairs through the prism of commodities. The report ranks major SITC 3 digit commodities in terms of export from China and from different countries according to their Revealed Comparative Advantage and calculate their rank correlation. It turns out that the rank correlation with India is 0.39 which takes to the 9th position among the 19 countries reported. Thus in spite of similarity in endowments the level of export competition for the two countries is much lower than can be expected. This is an important point to make in the context of this paper as this clearly suggests that we should be able to identify sectors even within the manufacturing sector both in India and China that are not at loggerheads with each other and therefore can flourish without feeling threatened from each other.

The rest of the paper is arranged as follows. In next section, we provide a brief overview of the two economies. Next section describes the methodology adopted in the study to identify the areas of advantages for the respective countries and to identify sources of such advantages. We report and discuss the results in the following Section. Last section concludes the paper.

2. INDIA VS. CHINA: THE CURRENT SCENARIO

Table 1 presents the well known fact that China has economically outperformed India and is currently in a superior position in almost every economic aspect that one may

[3] E.g., see Amity and Freund (2008) for China's export performance and Tendulkar (2000) and Sharma (2000) among others for India's export performance.

[4] See, for example, Huang and Khanna (2003), Guruswamy, Kaul and Handa (2003), Chaudhuri and Ravallion (2006), Aziz (2008), among others.

Table 1. Economic and Trade Parameters (2009)

Country	China	India
GDP (US $ billion)	2657.84 (10.78%)	874.77 (4.72%)
Per Capita GDP ($)	2021.97	756.68
Population (Million)	1,312 (19.8%)	1,109 (16.9%)
Degree of Openness	0.0006	0.0003
Share in World Export	8 %	1 %
Share in World Import	6 %	1 %
Export Growth (2006-6)	121 %	99 %
Import Growth (2006-6)	85 %	140 %
Export/GDP	0.0004	0.0001
Import/GDP	0.0003	0.0002
ECR*	0.6	0.674

Source: World Economic Outlook Database, 2009

* Export Concentration Ratio estimated for 2010 and dividing the market into four regions: USA, EU, Japan and rest of the World.

**Figures in the first brackets indicate share in the respective world total.

imagine.[5] The obvious question to ask therefore is, why? The literature has debated this question at length. Difference in culture,[6] pre reform emphasis on education and health care (Sen, 2004; Sen, 2005) and post reform emphasis on fiscal decentralization, higher historical savings rates, less regulated labour market, superior industrial policies and emergence of high growth clusters in manufacturing, greater flow of foreign capital and undervalued exchange rate have all been considered and accepted as at least partially responsible for creating the gap.

The first piece of evidence that the explanation might turn out to be compelling comes from history. India's and China's per capita income were almost identical in US dollar terms as late as 1975 (158 and 176) and their growth rates throughout the 1950s, 1960s and up to late seventies were comparable: 3.9 % for China and 3.5 % for India (Tendulkar and Bhavani (2007)). The growth rates only started to diverge after China started to implement economic reforms since 1978. By the time India took its first tentative steps towards reforms in the mid 1980s, China's reform process was already relatively advanced. Taking 1985 as the point of departure for India and 1978 for China, the Chinese lead was therefore about seven years.

[5] See Koveos and Zhang (2006) for a more detailed analysis.

[6] A typical statement in this regard is: "its isolation from the great wars and revolutions of the 20th century meant that much of the thinking that ossified Indian society in earlier centuries exists even in this one. India knows what it has to do; but not know how to overcome the age-old obstacles to do it.", Jehangir S. Pocha, quoted in The Financial Express, 16th August, 2006 ('Can India Outperform China?').

Table 2. How far is India behind China?

Economic Milestones	India	China	Gap in Years
Approx Year of Commencement of Liberalisation	1991	1981	10
Size			
GDP $1t	2010	1998	9
GDP $4t	2014*	2008	6
Consumption			
Consumption Expenditure$800b	2008	2001	7
Consumption Expenditure$2t	2014*	2008	6
Development			
Per capita income $ 1000	2008	2001	7
Per capita income $ 3000	2014*	2008	6
Adult literacy (60%)	2001	1982	19
Infant mortality (50 per thousand)	2010	1980	27
External Earnings			
Total Export $ 100b	2006	1996	10
Total Export$ 1t	2013*	2006	7
Net FDI Inflow$20b	2010	1993	14
Net FDI Inflow $50b	2009	2004	5
Reserve			
Forex Reserve $200b	2010	2001	6
Forex Reserve $1t	2013*	2006	7

Source: World Economic Outlook Database, 2009.
*Years calculated as per the present growth rates of these variables.

On an average India needed about 9.2 extra years to arrive at the milestones reported in table 2. The two extra years needed by India (over and above the gap in implementing the reform process) is mainly due to the indicators of development in the social sector two of which (adult literacy and infant mortality) are considered in the table. However China was ahead in both of them from very early times.[7] China's adult literacy rate (percentage of literate persons above the age of 15) was 66 in 1982 compared to 41 for India in 1981. The corresponding figures for infant mortality (death per 1000 live births under the age of 1) in 1980 were 46 for China and 113 for India. The difference in the development in the social

[7] See Sen (2004, 2005) ('Passage to China', New Your Review of Books Dec 2, 2004 and 'What China Could Teach India Then and Now', The Asia Society, Feb 17, 2005).

Table 3. Reforms and Economic Progress: China vis-à-vis India

Change in Variables	First Decade		Second Decade		Cumulative	
	China	India	China	India	China	India
	1981-1991	1991-2001	1991-2001	2001-2008	1981-1998	1991-2008
GDP $b	185.36	210.33	945.34	739.64	825.347	949.97
Consumption Expenditure $b	112.11	152.12	562.49	438.61	489.721	590.73
Per Capita Income $	135.00	154.00	712.00	605.00	626	759.00
Adult Literacy	12.00	13.00	13.00	5.00	25	18.00
Infant Mortality	-10.00	-14.00	-6.00	-12.00	-16	-26.00
Total Export $b	47.61	42.40	239.18	113.42	161.705	155.82
Manufacturing Export as %age of Total Export	34.82%	-5.36%	-1.81%	-11.50%		-16.86%
Net Inflow of FDI $m	4101	5398.41	39875.00	17478.05	25384.42	86679.82
Forex Reserve $b	38.06	41.43	171.89	208.37	142.74	249.81

Source: World Economic Outlook Database, 2009.

Note: "Cumulative" does not mean that the two decades have been added up. In fact data considered up to 2008 here. So, from 1991 (India's period of reform) up to 2008 it becomes 18 years after reform. To make the comparison possible China's data also considered for 18 years after reform (till 1998 from 19981). In case of India, it has added up, since up to 2008 it is 18 years (adding up 1991 to 2001: 10 years plus 2001 to 2008: 8 years) after reform. So in "Cumulative" column the figures are less than equals to the number which adds up the two decades (1981 to 1991 and 1991 to 2001) for China.

sector is therefore a pre-reform phenomenon. Excluding these variables the average extra number of years needed by India comes down to about seven years – or the exact number of years that China got before India undertook economic reforms as well. The exact match between the beginnings of the reform implementation programs and the time that India, on an average took, to reach milestones set by China is not important for our analysis – indeed it is a corollary of the arbitrariness with which we have chosen the years 1978 and 1985, as the years from which reforms were initiated in the two countries (many will argue that India's reform programs did not start until at least 1991). Nonetheless the results are instructive. There is no doubt that India took approximately the same number of extra years to achieve arbitrary economic benchmarks set by China as the number of years by which it lags behind in terms of implementation of reforms.

Table 3 "normalizes" the seven year gap into a decade and provides comparisons for the growth rates for the same set of variables for China and India at ten year lags. Concentrating on the GDP and its per capita version (rows 1 and 3) in the table, the first point to note is that India has never grown at a faster pace than China in the post reform period. However,

comparing the growth rates for the first decade after reforms with the second decade it can be seen that the gap in growth rates have generally fallen as Indian growth rates have picked up in the second decade of its reforms. This may partly be due to the 'convergence' or 'catching up' hypothesis (income and its growth rate are inversely proportional) resulting from limits to cost innovation in China and shifts to newer steady states arising from changes in policies and institutions and the absence of such limits in India due to the belatedness of start time. However, it may also be due to the fact that it took considerably more time to implement the reforms in India. Whatever the reasons may be, the fact remains that there are some early evidences of growth rates converging for the two countries.

Another plausible explanation sometimes cited is the "later start and slower pace of Indian reforms" (Tendulkar and Bhavani, 2007). Since there appear to be little supplementary data support for this hypothesis in the literature, tables 2 and 3 present some circumstantial evidence that seem to suggest that the question can be answered in affirmative.[8]

Two facets of the comparative economic scenario thus stand out from the above analysis: First, that on an average, the Indian economy is about a decade behind the Chinese economy in terms of most economic indicators. And since China also began its reform programs about a decade earlier, there is reason to believe that belated economic openness in India has contributed to the current economic divide. Secondly, the growth rates (both GDP and per capita GDP) of the two countries appear to be headed towards convergence, and that is mostly because of faster growth rates in India rather than falling growth rates in China.

3. METHODOLOGY

Four categories of products have to be separated to evaluate the status of India and China in the global market: those in which China (India) has a clear advantage and those in which none (both) have a clear advantage. The method that we use here is to arrive at these products by their existing or *ex post* status in the global marketplace. The age old technique of computing the *ex post* global competitiveness of countries in particular products is the Revealed Comparative Advantage (RCA) index first suggested by Balassa (1965, 1977, 1989) (and subsequently refined by Utkulu and Seymen in 2004). The index is static: it can categorize products into those in which a particular country is competitive or non competitive in the global market at a particular point of time. To monitor the changing status of products one needs to compare the values of the index at different points in time. The

[8] One of the fundamental differences between India and China that has direct bearing on their relative economic performance is in their political systems. These political systems were formed in both countries in the early 1950s. Economic reforms on the other hand were initiated in China in the late 1970s and in India in the mid 1980s. The analysis in this section proceeds by using these dates as watershed points. Since the effect of reforms is ruled out in case of any divergence that occurred before its implementation, we assume that these divergences are due to reasons other than reforms. However, since many of these factors including the difference in political systems continued even after the implementation of the reforms, subsequent changes were the outcome of a mix of the two processes. To keep the categorization sharp however, we assume that any changes occurring after the reforms were due to the reforms.

comparison however cannot be straightforward. The cardinal properties of the RCA index are known to be inconsistent (Ferto and Hubbard, 2002). The alternative therefore is to use the index as an ordinal measure and compare the changes in rank of the commodities measured in terms of the index over different points of time. Alternatively other methods can be used that are naturally proficient for capturing changes over time. One such measure is the Shift Share method first proposed by (Huff and Sheer, 1967) that basically ranks, say, commodities according to their net shift over time relative to the 'expected' (average) change of all goods. While the change in rank of RCA gives us the change in relative position of the commodities in the export hierarchy, the shift share method gives the speed at which export of the commodities are expanding. If a commodity is identified through both measures the commodity is not only becoming important in the export basket it is doing so at a "more than average" speed, which makes a product of special importance. Note that the shift share method is therefore a "second order" method in this context and it cannot be negative if the change in rank of RCA is positive.

Table 4 puts together a mix of these static and dynamic measures of product identification for two arbitrary countries (A and B) and over time periods (t and t+1)

Table 4. Threat-Opportunity Matrix for India and China

				Country – B							
				RCA				$SS_{t+1,t}$		$\Theta_{t+1} - \Theta_t$	
				t		t+1					
				<1	>1	<1	>1	<0	>0	<0	>0
Country - A	RCA	t	<1	$\underline{a_{11}}$	$\underline{a_{12}}$	$\underline{a_{13}}$	$\underline{a_{14}}$	a_{15}	a_{16}	a_{17}	a_{18}
			>1	$\underline{a_{21}}$	$\underline{a_{22}}$	$\underline{a_{23}}$	$\underline{a_{24}}$	a_{25}	a_{26}	a_{27}	a_{28}
		t+1	<1	$\underline{a_{31}}$	$\underline{a_{32}}$	$\underline{a_{33}}$	$\underline{a_{34}}$	a_{35}	a_{36}	a_{37}	a_{38}
			>1	$\underline{a_{41}}$	$\underline{a_{42}}$	$\underline{a_{43}}$	$\underline{a_{44}}$	a_{45}	a_{46}	a_{47}	a_{48}
	$SS_{t+1,t}$		<0	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}	a_{57}	a_{58}
			>0	a_{61}	a_{62}	a_{63}	a_{64}	a_{65}	a_{66}	a_{67}	a_{68}
	$\Theta_{t+1} - \Theta_t$		<0	a_{71}	a_{72}	a_{73}	a_{74}	a_{75}	a_{76}	a_{77}	a_{78}
			>0	a_{81}	a_{82}	a_{83}	a_{84}	a_{85}	a_{86}	a_{87}	a_{88}

Note: RCA= Revealed Comparative Advantage. SS = Calculated percentage net shift over expected change (see Huff and Sherr (1967). Θ is the rank in terms of RCA. Each item a_{ij} or a_{ij} is a set consisting of a number of products (at 6-digit level), that satisfy the criteria noted in the table. For example, a_{22} consists of the tariff lines for which India's RCA>1 in 2006 *and* China's RCA>1 in 2006. Similarly, a_{68} consists of products/ tariff lines for which rank of RCA increased in 2010 (Θ>0) in case of China, and shift share is positive for India's exports.

Table 5. Identification of Products where Countries Have Advantage – Static Criteria

		China	
		Dis-advantage	Advantage
India	Dis-advantage		$a_{12} \cap a_{34}$
	Advantage	$a_{21} \cap a_{43}$	$a_{22} \cap a_{44}$

Table 6. Identification of Products where Countries Have Advantage – Dynamic Criteria

		China	
		Dis-advantage	Advantage
India	Dis-advantage		$a_{56} \cap a_{78}$
	Advantage	$a_{65} \cap a_{87}$	$a_{66} \cap a_{88}$

assuming that there are well defined commodity groups to work with. The static indicator is the usual RCA index. The dynamic indicators are the difference in rank in RCA and the net shift coefficient that identify the products which have exhibited a greater positive shift in exports compared to shift in overall exports. Each cell (a_{ij}) is a set of commodities that satisfy the criteria corresponding to the row and column heading of the cell.

The shaded regions indicate the areas where static criterion is matched to the static criteria and the dynamic criteria are matched to the dynamic criteria. The non-shaded parts are the parts where the static criterion is matched to the dynamic criteria. For example a_{12} consists of products for which A's RCA<1 and B's RCA>1 in time period t. Similarly, a_{34} consists of products for which A's RCA<1 and B's RCA>1 in time period t+1. To take yet another example, this time from the dynamic part of the table a_{56} consists of products for which net shift is positive in B's exports but negative in A's exports between t and t+1 (thus implying that these are products exhibit growing advantage for B relative to B's overall export performance) and declining advantage for A (again, relative to A's overall export performance). Note $a_{12} \cap a_{34}$ gives us the list of products for which B enjoys advantage over A according to the static criteria (A's RCA<1 *and* B's RCA>1 in both the years). Similarly $a_{21} \cap a_{43}$ consists of products for which A's RCA>1 *and* B's RCA<1 in both years, and these are the products where A has advantage over B according to static criteria.

By matching the static and dynamic criteria, we identify commodities where the maximum competition occurs between the two countries as follows:

1. RCA_{t+1} is greater than unity for both B and A (a_{44})
2. Change in RCA rank (Θ) is greater than zero for both the countries (a_{88})
3. Percentage net shift (as per the shift share methodology) is positive for both the countries (a_{66})

On the other hand A (B) has advantage if:

1. By the static criterion: RCA_{t+1} is less than unity in A (B) and greater than unity in B (A) (a_{34} (a_{43})).
2. By the dynamic criterion: intersection of the set of products where A's (B's) Θ is positive and B's (A's) Θ is negative with the set of products where A's (B's) net shift is positive and B's (A's) net shift is negative ($a_{87} \cap a_{65}$ ($a_{78} \cap a_{56}$)).

Other cells can be similarly interpreted.

Once the competing products have been identified we decompose the export growth of the two countries into various components for each of these product groups. As we have already mentioned China is one of the most "competitive" economies of the modern world. In particular it is believed that low priced Chinese goods have flooded markets of almost all countries in recent times. When we discuss competitiveness for the Chinese case, we are therefore talking about price competitiveness (whatever its source may be). Obviously price competitiveness cannot be the only source of growth of country's export. For example, export of almost all countries of the world has increased rapidly in recent times due to globalization and at least a part of the rise in a country's export must have been due to this "trend effect." The first step in determining the sources of export growth in any country is therefore to disaggregate the change in export into the trend effect and the price effect. For countries like India which is known to be generally less competitive than China the trend effect is expected to dominate the price effect, while the opposite should be true for countries like China.[9]

The technique that is used for this dis-aggregation is called the Constant Market Share (CMS) analysis. In this kind of analysis the trend effect is captured by the rise in exports that would have occurred if the country in question was just maintaining its share in exports in the face of a rising trend. In fact the CMS gives a richer set of results than the aggregate change in volumes just due to trend. The trend effect is further disaggregated into three parts: the world trade effect, commodity composition effect and, the market distribution effect. The world trade effect is the increase in country's export due to the increase in aggregate world export. This effect will be higher; greater is the rise in world export for all commodities taken together. Thus in periods of stagnating world exports this effect will be low, while periods of rapid world export, this effect is high. It should be noted that in actual empirical work, the world export is calculated after deducting the home export from world export. Thus by world export we actually mean, rest of the world export.

The commodity composition effect on the other hand is the advantage that a country derives if it exports high growth products rather than low growth products. The source of the advantage can be described as follows: if you are maintaining shares, your trade will increase more if you choose high growth products to maintain your shares with, rather than low growth products. The market distribution effect reveals whether the exports are concentrated in high growth destinations or low growth destinations. Now if a country is able to choose high growth commodities and destinations then a large part of its increase in exports can be explained by this choice rather than any change in the efficiency with which it produces the

[9] It should be noted that, while this is true for aggregate exports, there is no reason to believe that the argument will hold for all commodities. Thus the results at the disaggregated level are expected to give different results than at the aggregated level. The results at the disaggregate level will be especially useful to determine the commodities for which India does possess some competitive edge over China.

product. In fact it may so happen that the product has become less price competitive over time in the sense that its share in world trade for its own set of goods and destinations has actually fallen, however the world export of these goods and to these destinations have been growing so fast that volumes have increased even though shares have fallen. To judge a country's competitiveness we thus need to look at shares rather than volumes. In the constant share norm, the competitiveness effect is the residual after export growths have been controlled for all kinds of trend effects.

This means that two important decisions have to be taken for calculating the constant market share: the level of aggregation of commodities and destinations. The results are sensitive to this choice (Ahmadi-Esfahani, 2006; Jepma, 1986; Jempa 1988; Richardson, 1971a; Richardson 1971b). For instance, if the aggregation is done in such a way that high growth products and destinations are lumped together and if the country's export is more towards these groups then the commodity and market distribution effects will be large leaving a small (or even negative) change in export for the competitive term. On the other hand if the groups are formed in such a way that the low growth products and destinations are mixed together and exports are high there then these effects will be small leaving a large amount of change to be explained by the competitive term. The problem will be especially acute for a country whose high export products and destinations are intricately intertwined with low export products and destinations with one product or destination within a certain category having a low export but another product or destination has high exports. To take the case of destinations only, suppose a country exports a lot to USA and very little to Canada and that USA has a high growth rate of imports while the corresponding figure for Canada is low then the method will give a high value for the market distribution effect if we take USA and Canada separately and a low value if we lump them together as "North America." So, what really is "competitiveness" in the constant market share norm? Technically one would support the proposition that goods and destinations should always be taken at their highest levels of dis-aggregation possible. The "trend effect" will then have its optimum opportunity to take its course and whatever remains can be truly regarded as the competitiveness effect. We follow this logic in this paper.

4. RESULTS

4.1. Data Sources

This work has been done with 2006 and 2010 as the two time periods. In what follows we assume country A as India and Country B as China. The trade data has been taken from World Integrated Trade Solutions (WITS-A combined database of UN & World Bank). The data on various macro economic parameters have been taken from World Development Indicators Database, 2009 (A database of World Bank).

4.2. Areas of Competitiveness of India and China

First let us concentrate on the set which China exports but India does not (as per 2010 export data). We observe 249 such commodities, within which 81 are having RCA greater than one, 128 is showing Θ greater than zero, for 116 products net shift is positive. Although, they are not mutually exclusive sets. The average value of export is $ 183.20 million and the

share of these commodities in the total export basket of China is 0.048% and the compounded annual growth rate is 22.25% during 2006-10.

In case of China, highest number of products comes under the agricultural products as per the World Customs Union Classifications. Within this set, 19 products are showing RCA greater than one, 34 products are showing positive Θ and net shift is positive for 34 products. In the dynamic sense, there are much more opportunities in China than static in the agricultural products which is not exported by India. Again the average export value is $ 39.61 million and the share of these commodities is 0.09% in total export of agricultural commodities and its compounded annual growth is 19.2% during 2006-10. Only for pearls and precious metals the export of such commodities is negative.

As per the World Customs Organization (WCO) classifications, the highest number of products (94) has come under primary products category. Out of this 19 products are showing RCA greater than one, 29 products are showing positive Θ and 52 products are having positive net shift. Of course, there are mutual intersections. Although China has dynamic opportunities in primary goods, it does not seem so for technology intensive products and products where human capital involved. The average export value is $ 39,848.85 thousands for such products (which India does not export) in primary products set and its coefficient of variation is 321.25. The share of export for these products is 0.084 in primary products basket and its growth of export is 62.05% during 2006 to 2010.

Let us now concentrate on the commodities where India exports, but China does not export at all (in 2010). It has been observed that out of total 130 such products, 63 (highest number of products) products are in the Agricultural Products group. In the set of total commodity group 30 commodities have shown RCA greater than one, 76 have shown Θ greater than zero and for 65 products net shift is positive. So, it seems to appear that although there are only a few products for which, there are comparative advantage, but many more are going to be added in that list. The average value of total products is $ 5,696.82 thousand, which is not exported by China, and its variation with respect to mean is 618.54. The share of these commodities in India's total export basket is 0.006 and the growth rate of these commodities over 2007-10 is 245.58%.

As per the World Customs Organization classifications (table 7), we observe that in agricultural products, RCA is greater than one in case of 12 products, for 36 products Θ is positive, and for 30 products percentage net shift is showing positive values in the Shift Share calculations. Many of the products which China does not export are going to take very important positions in the trade basket of India. This is particularly true for the products under agriculture and engineering sector, where only 12 and 5 products are showing RCA greater than unity respectively in 2010 but around 36 products in agriculture and 14 products in engineering are showing positive Θ. Average Export Value of Agricultural Products is $ 2,014.11 thousand and its coefficient of variation is 349. The share of this agricultural products in the total basket of Agricultural commodities is 0.01 and the growth rate is 50.35% over 2006-10. The growth export during 2006-10 is negative for Leather and Travel Goods (-9.08%), Wood Charcoal and Cork (-36.93%), and Wood Pulp, Paper and Paper board article (-74.14%).

Following the Empirical Trade Analysis classifications (table 8) we observe that total 75 products are coming under the primary products category. Within these set, 14 products in 6 digit HS code are showing RCA greater than one, 23 products are showing positive Θ and 37 products are having positive net shift. This means at present there are only a few set of items where India is having advantage, but there are future potential for more. The average export

Table 7. Number of products (6-digit level) under different category (WCO Categories) – Competition and Advantages

Group	HS codes	Where there is no competition for China (India)				Where there is maximum competition			Where China (India) has advantage		Where China (India) has an edge (by RCA)
		Total	RCA > 1	Θ > 0	SS > 0	No. of Products where RCA>1 for both countries	No. of Products where Θ>0 for both countries	No. of Products where SS>0 for both countries	No. of Products (Static)	No. of Products (Dynamic)	No. of Products
Agricultural Products	'01-24	70 (63)	19 (12)	34 (36)	34 (30)	33	107	92	92 (113)	89 (159)	1 (1)
Mineral Products	25-27	13 (6)	2 (5)	5 (3)	6 (3)	10	30	34	19 (45)	13 (35)	0 (1)
Chemical Products	28-38	35 (17)	12 (7)	10 (10)	9 (8)	93	225	166	159 (134)	138 (133)	2 (6)
Plastics and Rubber	39-40	4 (1)	1 (0)	3 (1)	3 (1)	14	69	71	20 (27)	53 (25)	1 (0)
Leather and Travel Goods	41-43	9 (4)	3 (1)	5 (2)	5 (1)	10	5	4	14 (21)	8 (16)	0 (0)
Wood, Charcoal and Cork	44-46	6 (4)	0 (0)	4 (2)	4 (2)	4	20	15	15 (3)	8 (20)	0 (0)
Wood Pulp, Paper and Paperboard Articles	47-49	13 (2)	0 (0)	9 (0)	9 (0)	3	31	19	14 (14)	30 (22)	0 (0)
Textile and Textile Products	50-63	31 (1)	15 (0)	20 (1)	15 (1)	266	176	94	285 (132)	167 (122)	14 (9)
Footwear, Umbrellas and Artificial Flower	64-67	2 (0)	2 (0)	1 (0)	0 (0)	12	10	5	34 (6)	2 (14)	0 (0)
Stone, Cement, Ceramic and Glass	68-70	4 (0)	0 (0)	1 (0)	0 (0)	13	50	44	38 (18)	28 (11)	1 (0)
Pearls and Precious Metals	71	2 (6)	0 (0)	0 (4)	0 (4)	4	9	8	4 (12)	7 (11)	0 (0)
Engineering Products	72-90	47 (21)	20 (5)	29 (14)	27 (12)	95	501	525	397 (182)	362 (208)	8 (2)
Clocks, Watches and Musical Instruments	91-92	7 (0)	3 (0)	2 (0)	2 (0)	5	8	2	34 (4)	8 (10)	0 (0)
Arms and Ammunition	93	2 (5)	0 (0)	1 (3)	1 (3)	0	6	2	0 (0)	3 (2)	0 (0)
Furniture, Toys and Miscellaneous Manufactured Articles	94-96	4 (0)	4 (0)	4 (0)	1 (0)	9	45	23	88 (5)	15 (16)	0 (0)
Works of Arts and Antiques	97	0 (0)	0 (0)	0 (0)	0 (0)	0	1	1	0 (2)	3 (1)	0 (0)
All	All	249 (130)	81 (30)	128 (76)	116 (65)	571	1293	1105	1213 (718)	934 (805)	27 (19)

Table 8. Number of products under different category – China's Advantage versus India's Advantage – According to Skill & Resource Intensity

Group	Where there is no competition for China (India)				Where there is maximum competition			Where China (India) has advantage		Where China (India) has an edge (by RCA)
	Total	RCA > 1	Θ > 0	SS > 0	No. of Products where RCA>0 for both countries	No. of Products where Θ>0 for both countries	No. of Products where SS>0 for both countries	No. of Products (Static)	No. of Products (Dynamic)	No. of Products
Primary Products	94 (75)	19 (14)	29 (23)	52 (37)	24	86	82	47 (164)	52 (99)	2 (2)
Natural Resource Intensive Products	21 (7)	8 (2)	9 (3)	11 (3)	22	98	110	71 (69)	55 (66)	2 (0)
Unskilled Labour Intensive Products	32 (1)	16 (1)	18 (1)	11 (1)	271	231	133	388 (142)	188 (145)	14 (6)
(Capital)Technology Intensive Products	50 (23)	21 (8)	24 (22)	21 (12)	105	478	408	354 (169)	299 (224)	4 (4)
(Skilled) Human Capital Intensive Products	31 (3)	10 (1)	18 (2)	13 (2)	105	266	244	244 (135)	224 (126)	2 (2)
Unspecified	21 (21)	7 (4)	30 (25)	8 (10)	44	134	128	109 (39)	116 (145)	3 (5)
All	249 (130)	81 (30)	128 (76)	116 (65)	571	1293	1105	1213 (718)	934 (805)	27 (19)

value of India for the primary products which is not exported by China, is $ 6,864.48 thousand and its coefficient of variation is 647.24%. The share in total export in the primary products group is 0.014 and the growth rate is 385.5% during 2006-10. Only for the natural resource intensive products the growth rate is negative (-15.22%). The mean export value is highest in case of human capital intensive products ($ 31,673.06 thousand).

To identify the areas of maximum competition or the interactive set of the two countries, we identify the commodity set where both countries are having RCA>0 or Θ>0 or positive net shift. We have categorized these set of products into different commodity groups as per the World Customs Union classifications and Empirical Trade Analysis classification.

It has been found that maximum number of commodities (1,105) come under the criteria where net shift is positive. Again within these set of commodities, as per the World Customs Union classifications, 525 commodities (the maximum) has come under engineering

products, 166 products are coming under the chemical products group category. This implies in these sets of products the competition between two countries is going to be increased in future. Under the criteria where Θ is positive, total number of products is 1,293, and within these products also engineering groups (501) and chemical products groups (225) are revealing the maximum number of products.

As per the ETA classifications, 408 products (the maximum) belong to the set of Technology Intensive Products, within the category where percentage net shift (as per the shift share calculation) is positive. Again within positive Θ, maximum number (478) of products comes under Technology Intensive Products.

4.3. China's Advantage

These set of commodities has been found out both through static and dynamic criteria. The static criteria are defined with respect to RCA in 2010, and the dynamic criteria are defined through shift share calculations and DRCA (as discussed earlier). Total of 1,213 products are having advantage for China as per the static criteria. As per the dynamic criteria, 934 products are having advantage from China. So, it appears that in China there are more products which are having advantage at present, but in future the list is bound to fall. In the set of commodities where China have advantage includes crude oil, sodium sulphites, Peroxoborates (perborates), metals, fabrics, electrical machinery, etc.

First, let us look at the products as per the World Customs Union classifications. Here, engineering products (397) and textile products (285) are showing immense potentiality in the static set. In case of dynamic set also, the engineering products (362) and textile products (167), along with chemical products (138) are showing potentiality for China.

Again, if we look at the Empirical Trade Analysis classifications as per the static criteria, unskilled labour intensive products occupy the highest place with 388 products. Again for dynamic criteria, technology intensive products are having 299 products, which is the maximum among all other groups.

4.4. India's Advantage

These set of commodities has also been found out both through static and dynamic criteria. The static criteria are defined with respect to RCA in 2010, and the dynamic criteria are defined through shift share calculations and DRCA (as discussed earlier). Total of 718 products are having advantage for India as per the static criteria. As per the dynamic criteria, 805 products are having advantage from India. So, unlike China, India has comparative advantage in a few set of products at present, the list is bound to increase in near future. India is having advantage specially in fruits, cereals, Chemicals like Benzyl alcohol, textile material, non-electrical machinery, etc.

As per the WCO classification, it has been observed that India is having opportunities in 182 engineering products and 134 chemical products as per the static criteria. In case of dynamic criteria also, engineering products are having maximum number (208) of products followed by agriculture products (159).

Again as per the ETA classifications, 169 products are coming under technology intensive products as per static criteria and 224 products are coming under the same category as per the dynamic criteria.

4.5. Goods for which China has an Edge

In case of the products where China has an edge has been found out through RCA of different products in India and China in 2006 and 2010 (as discussed earlier). It has been found out that in 27 products China has an edge. The products mainly consist of textile products and metals. As per the WCO classification, 14 products are coming under the textile products category which is followed by engineering goods (8). As per the ETA classifications, 14 products are coming under the unskilled labour intensive products, which is the maximum in number.

4.6. Goods for which India has an Edge

In case of the products where India has an edge has been found out through RCA of different products in India and China in 2006 and 2010 (as discussed earlier). It has been found out that in 19 products India has an edge. Mainly, textile and chemical are the main products in this category. Benzyl alcohol and razors are some of the products here. As per the WCO classification, it has been observed that textile products have highest number of products (9) followed by chemical products (6). Again according to the ETA classification, it has been observed that under the category of unskilled labour intensive products, the maximum (6) products have come.

4.7. Sources of Export Growth of China and India

The Chinese source of export growth has mainly come from the competitiveness effect as seen from table 9. Here the World market has been divided into High, Middle, Less-developed and “others” set of countries. The labour productivity, export incentives given to the firms and other incentives in terms of bank credit, logistic supports probably lead to the enhanced competitiveness of Chinese exports. It has been observed that although China has targeted the low growing markets and commodities where the growth rates are low, the Chinese exports have overtaken the Indian exports in most of the category of goods. Except for some of the goods like, agricultural products, mineral and leather China’s competitiveness is always positive.

In case of India, although it has been observed that the India has targeted the right market, its competitiveness is negative. Here the World market has been divided into High, Middle, Less-developed and “Others” set of countries. Except for agriculture, chemicals, paper, footwear, cement, furniture, the competitiveness effect has become negative in all commodity groups. It seems that the sector specific export incentives and quality management is key word which may increase the sectoral export from India.

This result has been verified for the revised group arrangements (Table 10, 11), while each country is considered as one group. It has been observed that the result has been drastically changed. The competitiveness effect has become positive for India for aggregate trade. Again, for many categories like engineering, the competitiveness effect has shown the same syndrome; it is higher for China and for India it has become positive from negative. Again in case of Chemical products this effect has become higher for India, but China is still ahead of India.

Table 9. Sources of Chinese (Indian) Export Competitiveness: Countries Grouped

Commodity Groups	World Trade Effect	Commodity Composition Effect	Market Distribution Effect	Competitiveness Effect
Agricultural Products	91.0% (73.8%)	3.9% (-6.1%)	7.5% (30.4%)	-2.5% (1.9%)
Mineral Products	183.1% (33.8%)	-2.4% (12.6%)	-14.1%) (230.9%)	-94.8% (-177.3%)
Chemical Products	42.8% (62.2%)	-6.6% (-5.5%)	6.0% (18.3%)	57.8% (25.0%)
Plastics and Rubber	47.0% (96.8%)	-11.3% (5.6%)	-0.5% (20.8%)	64.7% (-23.2%)
Leather and Travel Goods	108.1% (114.4%)	20.4% (2.3%)	13.9% (7.9%)	-42.3% (-24.6%)
Wood, Charcoal and Cork	34.8% (40.4%)	-8.1% (72.5%)	-1.6% (12.5%)	74.9% (-25.4%)
Wood Pulp, Paper and Paperboard Articles	21.1% (50.7%)	-3.5% (-12.1%)	0.0% (23.2%)	82.3% (38.2%)
Textile and Textile Products	18.0% (75.2%)	-3.3% (2.8%)	7.5% (288.8%)	77.8% (-266.8%)
Footwear, Umbrellas and Artificial Flower	40.6% (61.2%)	4.0% (-2.5%)	6.2% (27.5%)	49.2% (13.8%)
Stone, Cement, Ceramic and Glass	33.9% (67.4%)	-9.2% (-48.4%)	1.3% (3.8%)	74.0% (77.2%)
Pearls and Precious Metals	69.8% (132.2%)	-4.0% (-28.2%)	-1.4% (-4.0%)	35.5% (-0.0%)
Engineering Products	32.9% (50.3%)	-7.8% (12.8%)	-2.8% (181.1%)	77.8% (-144.2%)
Clocks, Watches and Musical Instruments	130.0% (-178.2%)	-65.4% (8.6%)	1.1% (5.1%)	34.3% (264.5%)
Arms and Ammunition	28.2% (549.6%)	9.8% (-78.5%)	18.8% (-108.0%)	43.1% (-263.1%)
Furniture, Toys and Miscellaneous Manufactured Articles	38.7% (59.0%)	15.5% (-7.0%)	-5.1% (1.0%)	50.9% (47.0%)
Works of Arts and Antiques	38.2% (2218.5%)	-4.9% (-920.3%)	3.1% (13.3%)	63.6% (-1211.5%)
All	44.2% (64.8%)	-13.3% (-0.3%)	-0.5% (148.9%)	69.6% (-113.4%)

Table 10. Sources of Indian Export Competitiveness: Countries Un-Grouped

Category No	Category	World Trade Effect	Commodity Composition Effect	Market Distribution Effect	Competitiveness (Residual) Effect
1	Agricultural Products	73.3%	-6.6%	22.1%	11.2%
2	Mineral Products	30.8%	14.7%	23.6%	31.0%
3	Chemical Products	60.8%	-7.4%	15.0%	31.6%
4	Plastics and Rubber	92.3%	5.4%	10.0%	-7.8%
5	Leather and Travel Goods	112.0%	13.2%	24.7%	-49.8%
6	Wood, Charcoal and Cork	37.6%	5.3%	18.1%	39.0%
7	Wood Pulp, Paper and Paperboard Articles	50.3%	-11.1%	300.6%	-239.9%
8	Textile and Textile Products	73.0%	7.9%	22.4%	-3.3%
9	Footwear, Umbrellas and Artificial Flower	61.1%	3.6%	-5.0%	40.3%
10	Stone, Cement, Ceramic and Glass	67.6%	-47.5%	25.2%	54.7%
11	Peals and Precious Metal	127.4%	-23.1%	-3.4%	-0.8%
12	Engineering Products	46.8%	9.5%	6.5%	37.2%
13	Clocks, Watches and Musical Instruments	-165.5%	30.8%	116.5%	118.2%
14	Arms and Ammunition	557.4%	-224.3%	-488.9%	255.8%
15	Furniture, Toys and Miscellaneous Manufactured Articles	56.3%	-9.8%	6.1%	47.4%
16	Works of Arts and Antiques*	-	-	-	-
Aggregate Trade		58.2%	3.7%	15.7%	22.3%

5. CONCLUSION

Post reform comparison of growth rates and other economic parameters reveals that the reform has generated its benefits in both India and China. The country that has started reform earlier, she has reaped the benefits of it earlier than the other. While Indian economic growth has never surpassed that of China, at the same time, India has started to show the indication of attaining a higher developmental path at the later half of the reform. Moreover, it is the Indian economy which has started moving fast, which makes it possible that the developmental status of the two countries seems to be convergent in near future.

It is observed in many product categories Indian advantage has been eroded, which is revealed by a higher number of products coming out in static sense than in dynamic sense. But in aggregative sense, it is interesting to observe that while China is having advantage in many products in static sense, the number of products is falling in dynamic sense, and in the

Table 11. Sources of Chinese Export Competitiveness: Countries Un-Grouped

Category No	Category	World Trade Effect	Commodity Composition Effect	Market Distribution Effect	Competitiveness (Residual) Effect
1	Agricultural Products	90.4%	1.9%	-12.5%	20.2%
2	Mineral Products	166.1%	15.2%	-1.4%	-79.9%
3	Chemical Products	41.8%	-7.3%	9.9%	55.6%
4	Plastics and Rubber	44.8%	-12.7%	2.5%	65.4%
5	Leather and Travel Goods	105.1%	12.4%	-37.5%	20.0%
6	Wood, Charcoal and Cork	32.2%	-10.2%	2.5%	75.5%
7	Wood Pulp, Paper and Paperboard Articles	21.0%	-2.9%	6.1%	75.8%
8	Textile and Textile Products	18.4%	-2.5%	23.2%	60.9%
9	Footwear, Umbrellas and Artificial Flower	42.7%	7.1%	20.7%	29.5%
10	Stone, Cement, Ceramic and Glass	34.2%	-8.9%	10.5%	64.2%
11	Peals and Precious Metal	67.5%	-2.7%	15.6%	19.6%
12	Engineering Products	30.4%	-12.9%	11.9%	70.7%
13	Clocks, Watches and Musical Instruments	119.4%	-67.7%	3.0%	45.3%
14	Arms and Ammunition	28.6%	9.1%	-18.7%	81.0%
15	Furniture, Toys and Miscellaneous Manufactured Articles	36.2%	12.8%	-1.6%	52.5%
16	Works of Arts and Antiques*	-	-	-	-
	Aggregate Trade	34.3%	-8.7%	11.2%	63.2%

*As the trade of Arts and antiques are too small, disaggregation of each country in a group does not give any meaningful result.

case of India it is actually showing a rising trend. Again, mostly this rising trend in dynamic sense is originating from the technology intensive products for India. So, when at present, in most of the cases China is facing advantage, in the near future it should be the case in favor of India. So, although India's competitiveness at present remains at a lower stage of development than China, it should soon occupy a higher place.

A comparison between the sources of export growth of the two countries reveals that while world trade effect is dominant for India, the competitiveness effect is dominant behind China's export growth. The results for the ungrouped countries reveal that other than the competitiveness effect all the other effects are higher in case of India, which means only through competitiveness (mostly price competitiveness), China is able to grow its export in the World market as compared to India.

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